



# A new flight plan: Commercial aviation value chain in 2023



# Introduction

All along the commercial aviation value chain—airline operators, support providers, manufacturers, and suppliers—companies are recovering from the severe impacts of the pandemic. The industry also faces several fresh challenges, such as prolonged supply chain constraints, new patterns of travel, and increased pressure to reduce fossil fuel emissions. The basic assumptions guiding strategy, investment, and decision-making before the pandemic are no longer sufficient in this environment.

This paper discusses the implications of the current economic turbulence and the six key forces influencing the vector of industry growth. We also offer prescriptive guidance to help commercial aerospace value chain players navigate today's business challenges and emerge ready for the future of commercial aviation.

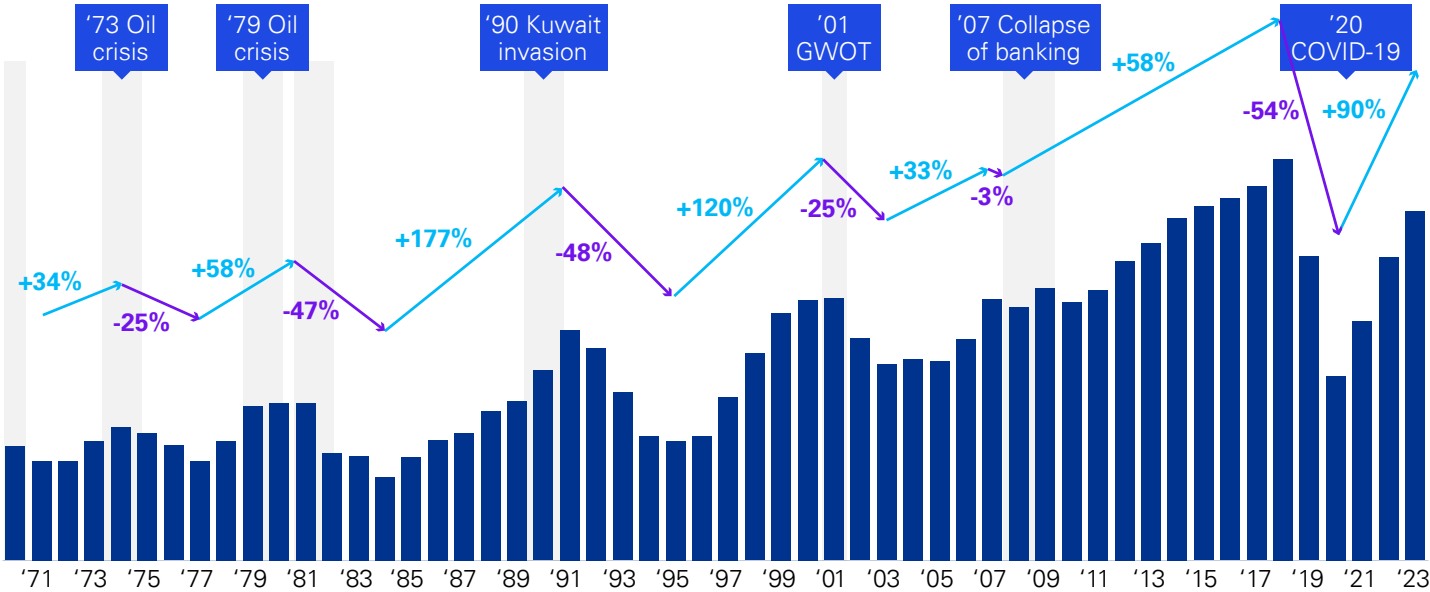


# What makes the current cycle so turbulent?

This isn't the first time the aviation industry needed to overcome significant obstacles. Events including the 1970s oil crisis, 9/11, and the 2008 economic crash each took their toll. In each of these cases, the sector rebounded, sometimes quickly, sometimes slowly, depending on the severity of the downturn and the complexity of the obstacles present. However, the recent downturn is unprecedented in both its nature (the dual shock of the 737MAX grounding and the global pandemic) and its severity. While the commercial aviation industry is regaining lost ground, more time is required for a complete recovery.



**Exhibit 1. Global Commercial Aircraft Deliveries, 1970-2023**



Source: Company websites (Boeing, Airbus, others), Speednews Commercial delivery data, IATA



### Aviation economics

Inflationary pressures, demand fluctuations, and reduced aircraft production rates will impact aviation economics for years.



### Global geopolitical dynamics

Recent geopolitical issues, such as the Russia-Ukraine war and increasing tensions with China, have placed new pressures on material supplies. Additional disturbances could create even more disruption.



### New ways of working and living

The pandemic and remote working reduced the volume of travelers and changed reasons for booking flights. Typical patterns of weekday business passengers and seasonal leisure travelers have evolved and blurred, disrupting legacy value chain approaches.



### Demographics and workforce dynamics

Labor challenges and skills gaps force the industry to rethink how to recruit, retain, and compensate skilled workforce.



### Environmental imperative

Commitments to lower carbon footprints pressure the industry to meet strict requirements, with potential regulation looming.



### Innovation

The convergence of multiple innovations could create enormous opportunities, as well as disruptions.



## Aviation economics



Nearly every economic driver in commercial aviation has been in a state of flux since 2019, when the 14-year super-cycle peaked at around 1,900 total deliveries.<sup>1</sup> With reduced travel during the pandemic, the need for additional aircraft plummeted. With this reduction in demand from airframers, there was decreased work for suppliers, resulting in financial stress for the supply chain. While production numbers today are improving, the recovery

process will be slow. Current indicators suggest that in 2024, narrow-body aircraft production will bounce back, beating the 2018 output level by about 7 percent.<sup>1</sup> This is mainly due to increased domestic travel. While the 2024 forecast finally exceeds the 2018 figure, it lags the pre-COVID estimates by 17 percent and falls short of last year's 2024 forecast by 12 percent (Exhibit 2).

<sup>1</sup> Source: KPMG Aerospace and Defense Quarterly Monitor Volume; Boeing, Airbus, analyst reports; KPMG analysis, March 2023

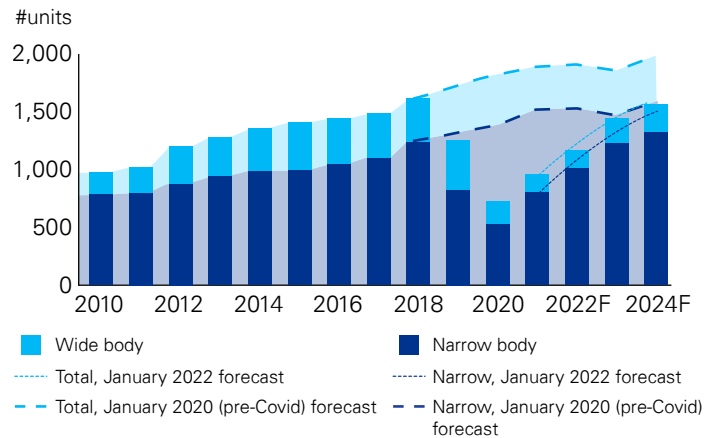
Wide-body aircraft production faces more challenges and a slower rebound, projected to reach only 56 percent of pre-pandemic production levels next year.<sup>1</sup> These figures underscore that different parts of the aerospace value chain will recover at varying speeds because each faces unique challenges. The fundamental shift in passenger volume and changing travel patterns will keep airlines guessing and encourage new pricing models and route plans to accommodate today’s travel realities, with implications for fleet strategies that will ripple through the ecosystem.

We expect a comeback to begin in M&A activity, after a sharp decline in 2022, but not until economic uncertainty clears up. Last year, aerospace deals fell by 27 percent from 2021 (a boom year for deals), and average transaction value fell by nearly half (Exhibit 3).<sup>2</sup> The current economic uncertainty that influenced this decrease will eventually give way either to favorable economic conditions that encourage M&A, or unfavorable conditions that force companies to consider M&A. At some point, the standoff will end, as companies pursue deals to enable growth and resolve challenges (e.g., supplier weakness). We

expect deals to result in further operator and supplier consolidation and anticipate an increasing emphasis on innovation, such as mobility-related technology. These trends will open doors for greater industry-wide efficiency.

## Exhibit 2. Deliveries far below 2019 levels, narrow body rebounding

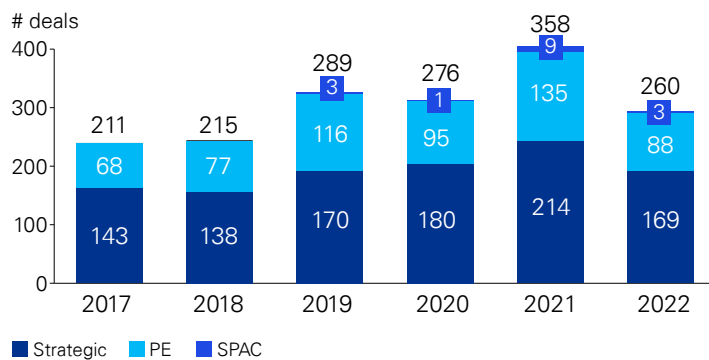
### Boeing and Airbus deliveries



Source: Boeing, Airbus, analyst reports, KPMG analysis

## Exhibit 3. M&A volume and value fell sharply in aerospace and defense in 2022

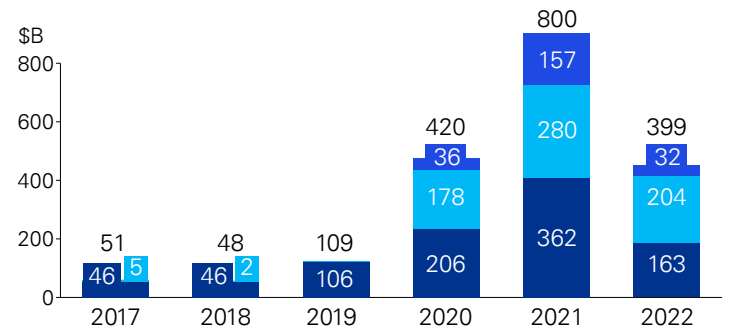
### Deal volume



Source: Capital IQ, Refinitiv, Pitchbook

## ...as did the total deal value

### Deal value



<sup>2</sup> Source: Capital IQ, Refinitiv, Pitchbook



## Geopolitical dynamics

The global nature of the A&D supply chain means that geopolitical dynamics such as the Russia-Ukraine war and growing retrenchment may put access to some critical materials at risk. Russia produces roughly 45 percent of the world's titanium parts used in aerospace and about 12 percent of the world's crude oil.<sup>3,4</sup> China accounts for 58 percent of raw (sponge) titanium production and 70 percent of rare earth metals production.<sup>3</sup> Approximately 65 percent of global semiconductor fabrication is done in Taiwan.<sup>5</sup>

Any future geopolitical issues involving these countries, including possible sanctions on Russian titanium, will negatively impact the industries that depend on these materials. In Myanmar, a major producer of rare earth metals, production fell by 23,000 tons, about 8 percent of the world's total annual production, in the wake of recent instability.<sup>3</sup>

To complicate matters, A&D is increasingly in competition for these materials with automotive, technology, and other industries. This exacerbates both price and supply issues.



## New ways of working and living



The pandemic has forced changes in both business and customer engagement strategies. For example, the reduction in business travel and the rise of blended business and leisure travel, or “bleisure” travel, has caused an evolution in business models and customer benefits.

Before COVID-19, flyers often found themselves locked into inflexible itineraries, and modifications involved hefty change fees. Post-pandemic, airlines modified their policies, often allowing passengers to change flights cost-free.

Flyer incentive programs have also evolved. Years ago, airlines started forming partnerships—such as Star Alliance, Sky Team, and One World—to incent customers

to choose flights and services within the same network. Since the pandemic, we have seen an expansion of those programs. For example, passengers can increase reward mileage with affiliated credit cards or gain benefits from rideshare programs, restaurants, and even cell service providers.

Some operators have created subscription plans for popular routes and premium economy has emerged as a new class of travel on international flights. As reasons for travel shift, it remains to be seen which changes in customer experience, route planning, and airplane configurations will stick.

<sup>3</sup> 2023 Mineral Commodity Summaries, U.S. Geological Survey

<sup>4</sup> BP Statistical review 2022

<sup>5</sup> “Progress in Importation of US Equipment Disperses Doubts on SMIC’s Capacity Expansion for Mature Nodes for Now” Simon Kuo, TrendForce, March 2021

## Workforce dynamics



Today, two factors make it more difficult for the industry to hire and retain the staff necessary to optimize operations and support growth. First, following the COVID pandemic, retirement rates surged, resulting in a “brain drain” in the aerospace sector. Secondly, an economy-wide labor shortage makes it challenging to backfill those positions and build a pipeline of younger staff. These changes in

employee demographics will force the sector to rethink how it attracts, trains, and retains skilled talent. To compete for the best talent, we believe that companies will need to build meaningful experiences for employees, form closer partnerships with educational institutions to ensure training in needed skills, and find ways to retain key talent.

## Environmental imperatives



As the industry pursues ESG goals, it faces current and potential regulatory directives to reduce its carbon footprint. In the U.S., for example, the 2021 FAA Climate Action Plan seeks to encourage net-zero carbon emissions by 2050.<sup>6</sup> In the European Union, the ReFuelEU initiative requires increased usage of sustainable aviation fuel (SAF), targeting 70 percent of fuel in 2050.<sup>7</sup> In the UK, the “Jet Zero” strategy also calls for net zero emissions by 2050 for aviation and 2040 for airport operators.<sup>8</sup>

While SAF is a primary method of achieving sustainability for aircraft, there are other short-term ways the industry can enhance sustainability with existing technology. Possibilities include upgrading manufacturing facilities to use cleaner energy production (such as solar or natural gas), reducing the miles that supply materials must travel

by onshoring, and identifying ways to reduce waste and recycle material.

While the industry proceeds with eco-friendly practices, it remains to be seen who will pay for the changes. Hefty investment is required to scale SAF production to the level needed to achieve 2050 goals. While technologies such as electrical propulsion or hydrogen fuel cells offer the potential for long-term emission reduction, these advances will take decades of sustained investment before they are practical for commercial flight. Funding could come from investments by carriers, government incentives, or higher fares—most likely a combination of the three. While many travelers like going green, they may not be willing to pay higher ticket prices to cover the cost.

## Innovation



Innovation has long been at the heart of commercial aviation, and the pace of advancement creates a large opportunity. The FAA’s “NextGen” initiative, for example, encourages development of alternative jet fuels, more advanced and efficient engines, and airframe modifications to reduce fuel consumption and increase safety. Aircraft engineers and materials scientists continue to pursue new materials that offer extra durability, reduce weight, and minimize contrails.

Mobility solutions continue to evolve, including urban air mobility (UAM) and drone delivery. While UAM technology has progressed, including eVTOLs, an infrastructure to support widespread use is not yet in place. This will need to include robust communication and unmanned air traffic management system, ground infrastructure, and seamless mobility-as-a-service platforms.

<sup>6</sup>“U.S. Releases First-Ever Comprehensive Aviation Climate Action plan to Achieve Net-Zero Emissions by 2050,” FAA, November 9, 2021

<sup>7</sup>“European Green Deal: new law agreed to cut aviation emissions by promoting sustainable aviation fuels” European Commission, April 2023

<sup>8</sup>“Source: “2040 zero emissions airport target” UK Department for Transport, May 2023

Airport operators also want to make travel more streamlined for passengers and cost-effective for airlines with better scheduling and different route structures. AI and big data can help carriers by automating processes and identifying new approaches to legacy operations. We expect that operators, airports, and the industry's supporting infrastructure will increasingly rely on technology and predictive analytics to anticipate and respond to demand shifts. For example, the Terminal Flight Data Manager (TFDM) program's expanding rollout will save fuel and reduce emissions by streamlining the flow of flight departures.

New visualization and scheduling capabilities, combined with better load balancing among runways, can also increase the efficiency of airport surface traffic. With AI and connected devices, robots can assist ground control teams and even support tasks such as aircraft maintenance. Improved technology in automatic separation software can enhance air traffic control systems and improve safety. Optimizing planes' flight paths can help reduce fuel consumption.

#### Exhibit 4. The focus of innovation



## Future of aviation

### Electrification

- Hybrid propulsion
- Batteries
- Electric controls
- Electric propulsion

### AI / Big data

- Predictive analytics
- Airport efficiency
- High-performance computing
- AI / Deep learning

### Autonomy / Robotics

- Maintenance robots (snakes, beetles)
- Airport operations
- Self learning systems
- Stability / flexibility

### 5G / Digital / Connected

- Connected devices
- Cloud-enabled
- IoT Platform
- Infrastructure
- Blockchain
- M2M
- Cybersecurity
- Cryptocurrency

### Sustainability

- Hydrogen fuels
- Net zero
- SAF
- Circular economy
- Contrail management

### Mobility

- Urban air mobility
- Shared transport models
- Drone delivery
- eVTOLs



# Implications for the industry

Given these six forces, we may see several potential implications for the aerospace industry and its ecosystem:

## Permanent shift in business demand

While the sector has an opportunity for significant long-term growth, much uncertainty lies ahead. The ecosystem currently operates at a growth rate below its pre-pandemic levels. However, overall demand has started to pick up again. In some regions, passenger miles returned to their pre-Covid peaks.

## Continued financial pressure

For now, the industry must continue to navigate the commercial supply chain, debt, and workforce challenges and integrate strategies for greener operations. There may also be greater competition from alternatives such as high-speed rail on shorter flights.

## Supplements to traditional air travel

The industry could see the emergence of urban air mobility as a route extender but not replacements for current air travel.

## Environmental initiatives

We believe several technological advances will help drive the changes necessary to achieve reduced emissions by 2050. Today, we see the rise of alternate power sources such as SAF, electrification, and hydrogen. Innovations such as improved fuselage designs and new engines will improve fuel consumption. Enhanced route planning and more streamlined runway operations can reduce the need for fuel. In the manufacturing process, shortening the supply chain, reducing waste, and using cleaner sources of power, such as solar and natural gas, can also reduce emissions.



# Tips to help navigate today's turbulence

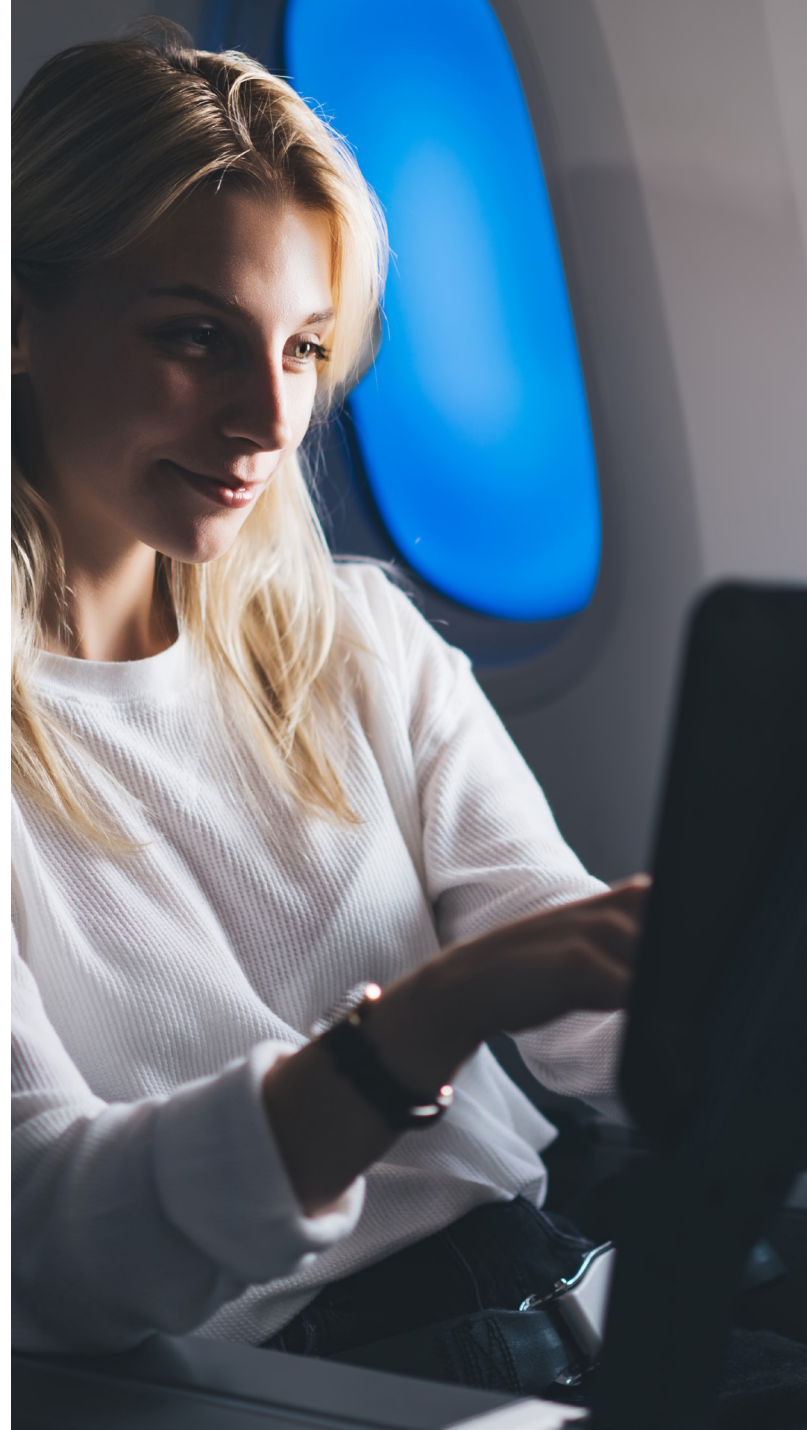
To thrive in the changing landscape facing the aerospace value chain, companies can prepare now in several ways:

## Embrace the rise of “bleisure” travel

The “bleisure” category creates new opportunities to improve passenger experiences in ways that add value. First, given the retreat of reservation change fees during COVID, carriers should explore whether any other costs can be disaggregated and offered to customers differently. Secondly, the industry can emphasize intermodal connections, including route extenders such as car services, trains, urban air mobility, and hotels that encourage ancillary revenue beyond point-to-point air travel to build share of wallet. A third key is building a pricing model that distinguishes the corporate and individual customer segments and provides each with practical benefits. For example, passengers who regularly fly between two destinations can benefit from cost-effective route subscriptions or seating tier reconfigurations to make flying more economical and comfortable.

## Catch up and leapfrog in technology

The industry has not always been on the technological forefront, but this is a time of healthy profitability, when companies can invest in new technology across operations. Advances in data and analytics—including the emergence of generative AI—create many opportunities across the aerospace industry. The right tools and information will help automate processes and streamline tasks like ground handling, aircraft boarding, air traffic control. Data analytics can help improve maintenance, repair, and operations (MRO) and reduce unplanned downtime. AI can help agents (human or bots) provide



better service. Advanced simulation and modeling allow the industry to better prepare for shifts in travel patterns that could impact fleet strategies, network optimization, and yield management. Updates to legacy systems can also improve performance. Evaluate additive manufacturing techniques, including the talent, expertise, and investments required to support them. Lastly, we suggest that the industry evaluates and balances its investments in new propulsion types like SAF, battery power, and hydrogen.

### Think creatively about supply chain

The industry has worked hard to meet the supply chain challenges of the past few years and that puts manufacturers back on path to reach pre-pandemic production rates. But the battle is not over and stabilizing supply chain remains a top priority for our clients. To finish the job and create supply chains that are resilient to the next disruption, it's time to think beyond the standard solutions. For example, we expect more companies to "insource" components that they can make themselves to ensure availability, even if costs are higher. OEMs and Tier 1 suppliers may snap up smaller suppliers, rather than hoping they can make it on their own.

### Prepare for industry consolidation

Mergers and acquisitions usually occur when difficult economic conditions make the changes mandatory or favorable valuations make them highly attractive for profitability. In today's market, M&A could result in the consolidation of low-cost carrier airlines, MRO, and supply chains. In preparation, the industry should lay out a long-term strategy to address the implications of a supply-constrained world and maintain control of value sources like data and passenger experiences. They should also evaluate the potential impacts of bottlenecks in machined parts, sensors, and more, across the supply chain. Through this process, companies can also determine which capabilities should remain in-house and which should be owned by suppliers and partners.

### Create long-range staffing plans

The staffing challenges of the past few years are not fully resolved. Companies need to work on ways to deal with immediate staffing challenges, such as by finding ways to "variabilize" workforce size to better match changes in demand. Longer term, the industry needs to do better at attracting and retaining talent—both to make up for the loss of older workers during the pandemic and to prepare for future needs. Given the diminishing supply of talent with critical industry expertise and the competition for workers with tomorrow's skills (e.g., AI), companies should consider partnering now with educational institutions to develop a pipeline for future talent.



## For more information, contact us:



**Steven Beckey**  
*Principal, A&D Strategy*  
310-849-0016  
[stevebeckey@kpmg.com](mailto:stevebeckey@kpmg.com)



**Todd Dubner**  
*North America Industrial  
Manufacturing Deal  
Advisory and Strategy  
Leader*  
917-691-2322  
[tdubner@kpmg.com](mailto:tdubner@kpmg.com)



**Jono Anderson**  
*Principal, A&D Strategy*  
858-750-7330  
[jonoanderson@kpmg.com](mailto:jonoanderson@kpmg.com)



**Christopher Brown**  
*Partner, Global Strategy  
Group*  
+35317004453  
[christopher.brown@kpmg.ie](mailto:christopher.brown@kpmg.ie)



**Grant McDonald**  
*Global Head of Aerospace  
and Defense*  
+12464343900  
[grantmcdonald@kpmg.bb](mailto:grantmcdonald@kpmg.bb)



**Stéphane Souchet**  
*Global Head of Industrial  
Manufacturing*  
+33155683390  
[ssouchet@kpmg.fr](mailto:ssouchet@kpmg.fr)

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